Neuburg Siliceous Earth in water-based corrosion protection DTM acrylate single-layer black

Objective

Improvement of anti-corrosion properties

Neuburg Siliceous Earth: Aktisil AM

Formulation

			$BaSO_4$	Aktisil AM
Filler paste	Water demineralized		33.89	53.89
	Additol XW 6588	Dispersing additive	5.76	5.76
	Byk 024	Defoamer	3.07	3.07
	Dowanol DPM		5.76	5.76
	Aerosil R 972	Thickener	0.38	
	Barium sulfate natural	Filler	105.79	
	Aktisil AM	Functional Filler *1		91.02
	Nubirox 102	Anti-corrosion pigment	33.99	
	Additol VXW 6388	Thickener	0.48	
	Rheobyk 7420 ES	Thickener	2.88	
Subtotal			*192.0*	*159.5*

Black paste	Water demineralized		63.29
	Surfynol 104 E	Surfactant	0.34
	Colour Black OE 430 W	Pigment black	20.87
Subtotal			*84.5*

Formulation completition	Setaqua DTM 6851	Acrylic dispersion	714.0	714.0
	Ammonia 25%		2.0	2.0
	Filler Paste		*192.0*	*159.5*
	Black Paste		*84.5*	*84.5*
	Water demineralized		10.0	
	flashproTAC C4E	Flash rust inhibitor	2.0	1.0
	Byk 024	Defoamer	2.0	1.0
	Asconium 142 DA	Org. corrosion inhibitor		20.0
	AMP 90	Neutralizing agent		1.5
	Tego Wet KL 245	Wetting agent		2.0
	Tego Glide 494	Slip and flow additive		1.5
	Tafigel PUR 45 (1:1 in Water)	Thickener		10.0
	Additol VXW 6387	Anti-settling	2.0	
	Additol XW 6580	Wetting agent	2.5	
	Additol VXW 6388 (1:10 in Water)	Thickener	28.5	
Total			**1039.5**	**997.0**
Pigment volume concentration [%]			12.3	
Solids content w/w [%]			46.2	43.5

*1 Replacement of filler by equal volume

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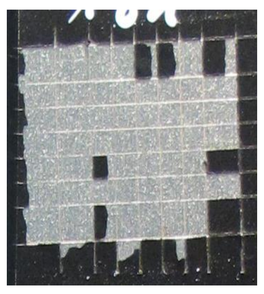
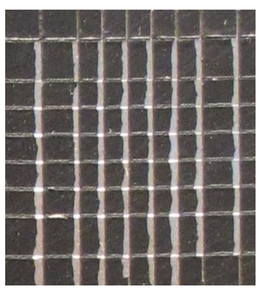
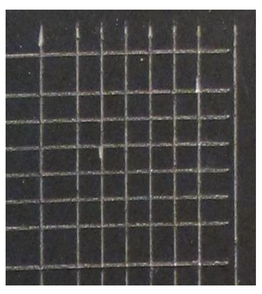
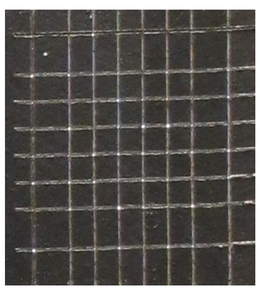
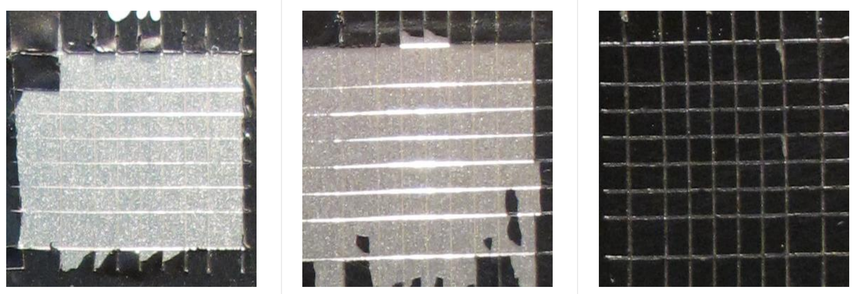
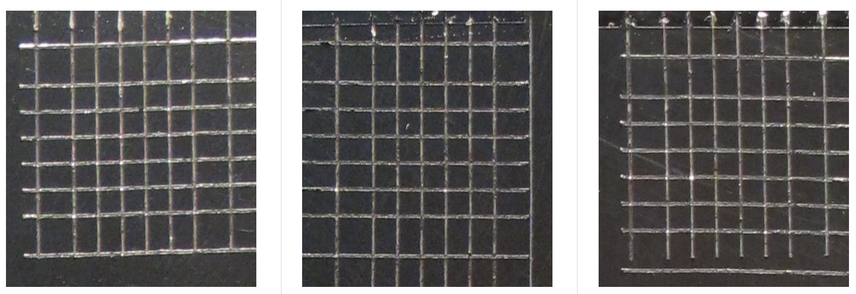
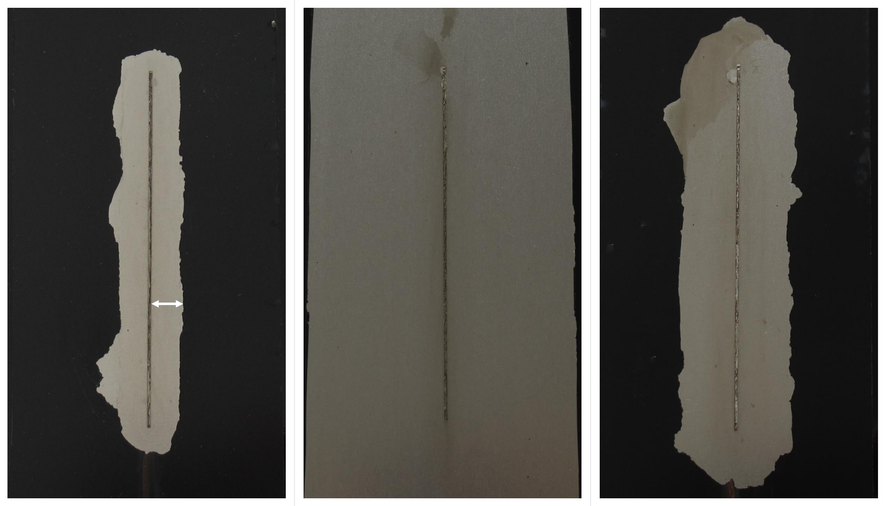
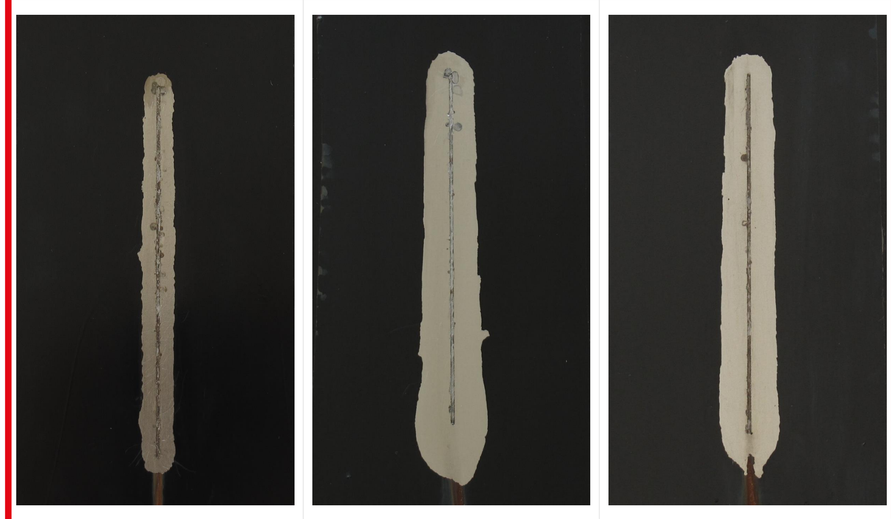
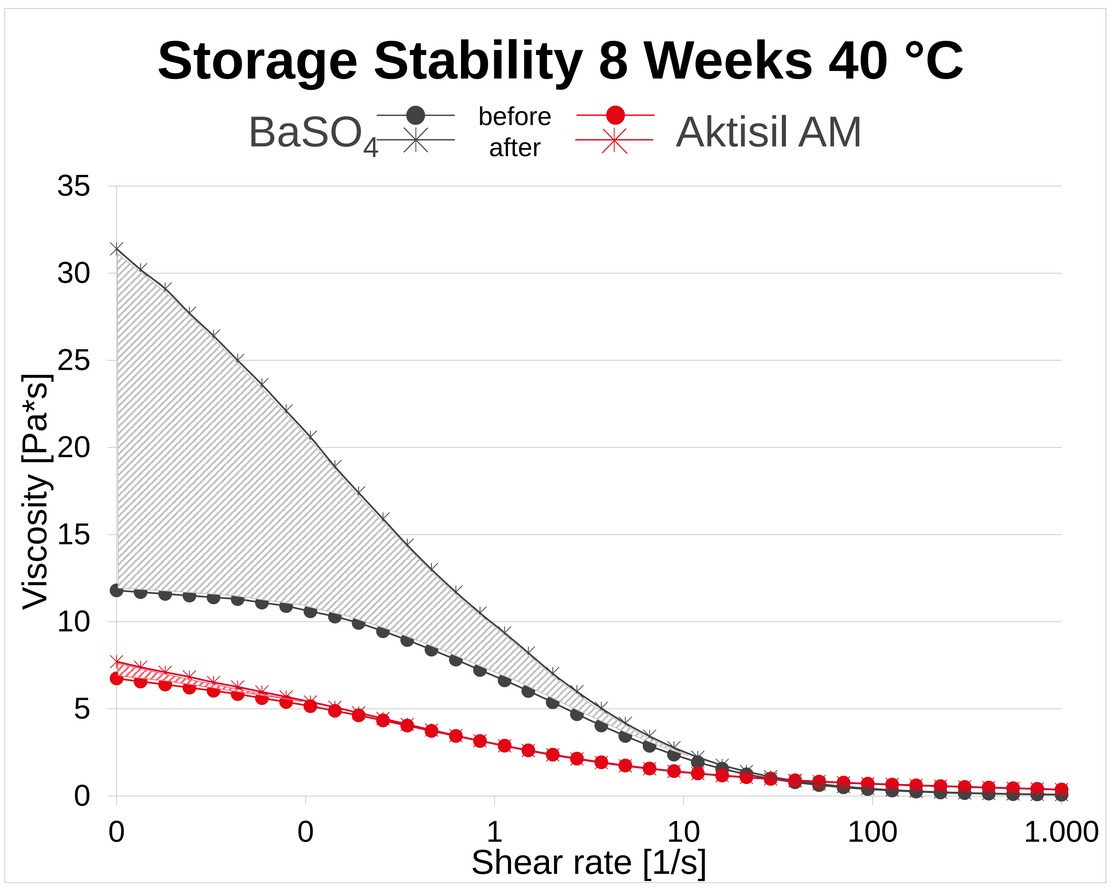
Results

Substrate: cold rolled steel Q-Panel R 48, total dry film thickness 80 µm as single-layer, tests after dust-dry and 30 min 60°C

		Barium sulfate natural		Aktisil AM	
Humidity test (CH)	Test duration	18 h	250 h	18 h	250 h
	Regeneration time 23 °C, 50 % rel. H.	1 h	24 h	1 h	24 h
	Cross-cut 2 mm				
Salt spray test (NSS)	Test duration	18 h	250 h	18 h	250 h
	Regeneration time 23 °C, 50 % rel. H.	1 h	1 h / 24 h	1 h	1 h / 24 h
	Cross-cut 2mm				
	Test duration	90 h	250 h	90 h	250 h
	Regeneration time 23 °C, 50 % rel. H.	24 h	1 h / 24 h	24 h	1 h / 24 h
	Delamination at scribe				
		10 mm	Completely delaminated / 16 mm	4 mm	8 mm / 7 mm

triple lifetime

Storage Stability 8 Weeks 40 °C



Summary

Improved Features:

+ Filler paste preparation is already storage stable without thickener (no sedimentation)
+ Liquid laquer with higher rheological stability during storage
+ Higher gloss
+ Good adhesion to the substrate, even in the wet condition during corrosion exposure
+ Improvement of delamination at the scribe, even in the wet condition during corrosion exposure
+ High performance with anti-corrosion inhibitor instead of anti-corrosion pigment